

## CLAIMS

- 1 1. A system adapted to distribute route selection in an implementation of a routing proto-  
2 col executing on a router of a computer network, the system comprising:  
3 a first process of the routing protocol configured to receive announced paths from  
4 peers of the router and perform a first stage of route selection to select partial best paths;  
5 a second process of the routing protocol configured to perform a second stage of  
6 route selection to select best paths in response to the partial best paths forwarded by the  
7 first process, the second process further configured to send the selected best paths to the  
8 first process for announcement to the peers.
- 1 2. A method for distributing route selection in an implementation of a routing protocol  
2 executing on a router of a computer network, the method comprising the steps of:  
3 receiving announced paths from peers of the router at a plurality of first processes  
4 of the routing protocol;  
5 performing a first stage of route selection at the first processes to select partial  
6 best paths;  
7 forwarding the partial best paths to a second process of the routing protocol;  
8 performing a second stage of route selection at the second process to select best  
9 paths; and  
10 sending the selected best paths to the first processes for announcement to the  
11 peers.
- 1 3. The method of Claim 2 wherein the routing protocol is a Border Gateway Protocol  
2 (BGP) and wherein route selection includes a BGP best path selection algorithm.
- 1 4. The method of Claim 3 wherein the first processes are speakers and wherein the sec-  
2 ond process is a BGP routing information base (bRIB).

- 1    5. The method of Claim 4 further comprising the steps of:  
2        providing a plurality of first processors configured to run the speakers; and  
3        providing a second processor configured to run the bRIB.
  
- 1    6. The method of Claim 4 wherein the step of performing the first stage of route selec-  
2        tion comprises the step of splitting the announced paths for each prefix into a plurality of  
3        groups such that within each group, the BGP best path selection algorithm is a transitive  
4        relation.
  
- 1    7. The method of Claim 6 wherein the step of splitting comprises the step of grouping  
2        the paths according to an autonomous system (AS) from which they were received.
  
- 1    8. The method of Claim 7 wherein the step of performing the first stage of route selec-  
2        tion further comprises the step of calculating a best path in each group using the BGP  
3        best path selection algorithm.
  
- 1    9. The method of Claim 8 wherein the step of performing the first stage of route selec-  
2        tion further comprises the step of performing a comparison between each best path from  
3        each group.
  
- 1    10. The method of Claim 9 wherein the step of performing a comparison further com-  
2        prises the steps of:  
3        selecting a path with a highest degree of preference;  
4        selecting a locally originated path over a learned path;  
5        selecting a path with shortest AS\_path; and  
6        selecting a path with lowest origin.
  
- 1    11. The method of Claim 10 wherein the step of performing the first stage of route se-  
2        lection further comprises the step of forming a set of partial best paths forwarded to the

3 bRIB from any paths that have not been discarded by running the algorithm at each  
4 speaker.

1 12. The method of Claim 11 wherein the step of performing the second stage of route se-  
2 lection comprises the step of using the full BGP best path selection algorithm to select a  
3 best path per prefix from among the partial best paths received from all speakers.

1 13. A system adapted to distribute route selection in an implementation of a routing  
2 protocol executing on a router of a computer network, the system comprising:  
3 a plurality of first processes of the routing protocol configured to receive an-  
4 nounced paths from peers of the router and perform a first stage of route selection to se-  
5 lect partial best paths;  
6 a second process of the routing protocol configured to perform a second stage of  
7 route selection to select best paths in response to the partial best paths forwarded by the  
8 first processes, the second process further configured to send the selected best paths to  
9 the first processes for announcement to the peers.

1 14. The system of Claim 13 wherein the routing protocol is a distance vector routing  
2 protocol.

1 15. The system of Claim 13 wherein the routing protocol is a Border Gateway Protocol  
2 (BGP) and wherein route selection includes a BGP best path selection algorithm.

1 16. The system of Claim 15 wherein the first processes are speakers and wherein the  
2 second process is a BGP routing information base (bRIB).

1 17. The system of Claim 16 further comprising:  
2 a plurality of first processors configured to run the speakers; and  
3 a second processor configured to run the bRIB.

1 18. The system of Claim 17 wherein each speaker splits the announced paths for each  
2 prefix into a plurality of groups such that within each group, the BGP best path selection  
3 algorithm is a transitive relation.

1 19. The system of Claim 18 wherein the groups are organized according to an autono-  
2 mous system (AS) from which they were received.

1 20. The system of Claim 19 wherein each speaker further calculates a best path in each  
2 group using the BGP best path selection algorithm.

1 21. The system of Claim 20 wherein each speaker further performs a comparison be-  
2 tween each best path from each group.

1 22. The system of Claim 21 wherein the speaker performs the comparison by (1) dis-  
2 carding the path with the lower degree of preference, (2) discarding a learned path if the  
3 other path is locally originated, (3) discarding the path with longer AS\_path, and (4) dis-  
4 carding the path with higher origin.

1 23. The system of Claim 22 wherein any paths that have not been discarded by running  
2 the algorithm at each speaker form a set of partial best paths that are sent to the bRIB.

1 24. The system of Claim 23 wherein the bRIB performs the second stage of route selec-  
2 tion using the full best path selection algorithm to select the best path per prefix from  
3 among the partial best paths received from all speakers.

1 25. Apparatus adapted to distribute route selection in an implementation of a routing  
2 protocol executing on a router of a computer network, the apparatus comprising:  
3 means for receiving announced paths from peers of the router at a first process of  
4 the routing protocol;

5           means for performing a first stage of route selection at the first process to select  
6 partial best paths;

7           means for forwarding the partial best paths to a second process of the routing  
8 protocol;

9           means for performing a second stage of route selection at the second process to  
10 select best paths; and

11          means for sending the selected best paths to the first process for announcement to  
12 the peers.

1   26. A computer readable medium containing executable program instructions for distrib-  
2 uting route selection in an implementation of a routing protocol executing on a router of a  
3 computer network, the executable program instructions comprising program instructions  
4 for:

5           receiving announced paths from peers of the router at a plurality of first processes  
6 of the routing protocol;

7           performing a first stage of route selection at the first processes to select partial  
8 best paths;

9           forwarding the partial best paths to a second process of the routing protocol;

10          performing a second stage of route selection at the second process to select best  
11 paths; and

12          sending the selected best paths to the first processes for announcement to the  
13 peers.